WHAT IS CLAIMED IS:

1. A materialization method of a photo detect device using quantum dots, in which the transfer and channels of carriers are set in the horizontal direction by heterointerfaces, insulator/semiconductor interfaces and impurity doping and the magnitude of the currents which flow through the channels is determined by the control of Fermi level, comprising the steps of:

forming quantum dot layers at predetermined positions near the channels so as to influence the potential of the channels in such a manner that the carriers should be released from the quantum dot layers in response to light detection and accumulated in the channels; and

providing the Fermi level at an activation position by confining the carriers within the quantum dot layers while limiting the number of the carriers in the channels for the purpose of minimizing a current flow in the absence of incident light.

2. A materialization method as set forth in claim 1, wherein the light is infrared light ranging, in wavelength, from 0.77 μm to 100 μm.

3. A photo detect device using quantum dots, comprising:

at least one quantum dot layer containing the quantum dots located near channels of carriers so as to influence the potential of the channels;

at least one light absorption layer containing at least one quantum dot layer, which is formed by alternating the quantum dot layer and a material different in band gap from the quantum dot layer;

at least one conduction path layer, in contact with the at least one light absorption layer, in which carriers excited in the light absorption layers are collected and conducted in a horizontal direction;

at least one impurity-containing layer in which impurities are so controlled in amount and distribution as to provide the carriers to the at least one light absorption layer, but not to the at least one conduction path layer;

at least two detect electrodes for conducting in the horizontal direction the carriers which are accumulated in the channels in response to the light incident on the at least one light absorption layer; and

one contact layer on which detect electrodes are formed to collect and to provide carriers.

4. A photo detect device as set forth in claim 3, wherein the at least two detect electrodes have a distance therebetween which is longer than the wavelength of the incident light in the device.

5. A photo detect device as set forth in claim 3, wherein the distribution of the impurities in the at least one impurity-containing layer take a shape of a delta function.

6. A photo detect device as set forth in claim 3, wherein the at least one impurity-containing layer have a uniform distribution of the impurities therethrough and are etched to control the number of carriers provided to the quantum dots.

7. A photo detect device as set forth in claim 3, wherein the at least one impurity-containing layer and the at least one light absorption layer are formed adjacent to the at least one conduction path layer.

8. A photo detect device as set forth in claim 3, wherein the at least one impurity-containing layer and the at least one light absorption layer are formed to be overlapped with the at least one conduction path layer.

9. A photo detect device as set forth in claim 3, wherein the at least one impurity-containing layer, the at least one conducting path layer and the at least one light absorption layer are made to have different band gaps so as to be subjected to heterostructures.

10. A photo detect device as set forth in claim 3, further comprising at least one control electrode for controlling the amount of the carriers provided to the at least one light absorption layer and the at least one conduction path layer.

11. A photo detect device as set forth claim in 10, wherein impurities which are opposite, in type, to those in the at least one impurity-containing layer are doped below the bottom layer of the at least one control electrode, to reduce leak currents of the at least one control electrode.

12. A photo detect device as set forth claim in 10, wherein a highly resistant layer is provided below the bottom layer of the at least one control electrode to reduce leak currents of the at least one control electrode.

13. A photo detect device as set forth in claim 10, wherein at least two control electrodes are used and provided sequentially with electric fields different in magnitude, so as to detect the carriers accumulated in the channels beneath the at least two control electrodes, in sequence.

14. A photo detect device as set forth in claim 13, wherein impurities which are opposite, in type, to those in the at least one impurity-containing layer are doped below a bottom layer of the at least two control electrodes, to reduce leak currents of the at least two control electrodes.

15. A photo detect device as set forth in claim 13, wherein a highly resistant layer is provided below the bottom layer of the at least two control electrodes to reduce leak currents of the at least two control electrodes.

16. A photo detect device as set forth in claim 13, wherein the at least two control electrodes are formed into at least two layers lest the control electrode in one layer may overlap with that in another layer, a matter with a large resistance is interposed between the at least two control electrode layers, and electric fields different in magnitude are subsequently applied to the at least two

control electrodes, whereby the charges accumulated in the channels beneath the at least two control electrodes can be, in sequence, detected.

17. A photo detect device as set forth in claim 16, wherein impurities which are opposite, in type, to those in the at least one impurity-containing layer are doped below the bottom layer of the at least two control electrodes, to reduce leak currents of the at least two control electrodes.

18. A photo detect device as set forth in claim 16, wherein a highly resistant layer is provided below a bottom layer of the at least two control electrodes to reduce leak currents of the at least two control electrodes.

19. A method for fabricating a quantum dot-employing photo detect device, comprising the steps of:

growing light absorption layers in such a way that quantum dots are naturally formed in the course;

depositing at least two electrode on a contact layers to show horizontal conduction;

reducing the resistance between the electrode and the contact layer;

etching the edge of the device to an extent necessary to reduce an electrical connection to other neighboring devices;

etching the contact layer and/or a carrier supplying layer to a depth necessary to control the amount of carriers provided to the quantum dots;

depositing at least one control electrode for controlling the carriers provided to the quantum dots;

depositing an insulating film to prevent a short circuit from being formed between the electrodes; and

etching a predetermined portion of the insulating film to transfer desired electrical signals to the outside of the insulating film.